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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/694,413 | 10/27/2003 | Kwok Keung Paul Ho | CS99-065CCB | 3898 |

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| EXAMINER | |
|---|---|
| GOUDREAU, GEORGE A | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1763 | |

DATE MAILED: 06/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/694,413 | HO ET AL. | |
| | Examiner | Art Unit | |
| | George A. Goudreau | 1763 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *(10-27-03' to 2-27-04')*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1 and 17-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *17-32* is/are allowed.

6)☒ Claim(s) *1* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

George A. Goudreau

GEORGE GOUDREAU
PRIMARY EXAMINER

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. Claims 17-32 are allowed.

2. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

-The wording used in the last paragraph of claim 1 is very confusing, and should be reworded.

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Soga et. al. (6,090,718).

Soga et. al. disclose a process for rie etching a trench in a Si wafer (2) using a SiO2 hard mask (1); and a plasma, which is comprised of (HBr-SiF4-SF6-O2). The rie etching chamber is cleaned after each wafer is rie etched before processing additional wafers through the rie etcher. The rie etcher is cleaned using a cleaning/ seasoning/ purge process. The interior surfaces of the rie etcher are cleaned by placing a dummy Si/SiO2 wafer in the rie etcher; and discharging a plasma, which is comprised of an SF6 gas. This cleaning step removes etch products left from the prior rie etching steps on the interior surfaces of the rie etching apparatus as well as the seasoning layer which

was deposited onto the interior surfaces of the rie etching apparatus. The interior surfaces of the rie etcher are then seasoned by discharging a plasma, which is comprised of (HBr-SiF4-SF6-O2) in the presence of a dummy Si/SiO2 wafer. The rie etcher is then purged of process gasses prior to processing additional wafers through the rie etcher. The 2nd wafer is then rie etched in the rie etcher. The cleaning process disclosed above is then repeated. The Si wafer is etched during the formation of a microelectronic device. This is discussed specifically in columns 4-12; and discussed in general in columns 1-18. This is shown in figures 2-19.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et. al. (6,325,948).

Chen et. al. disclose a process for wafer less cleaning, and wafer less conditioning of a plasma etcher which is conducted in between the processing of batches of wafers through the etching chamber. The process is comprised of the following steps:

-A dirty TCP (i.e.-transformer coupled plasma etcher) type rie etcher is cleaned in a plasma, which is comprised of (SF6-Cl2-O2) during a wafer less cleaning step.;

-The cleaned rie etcher is then conditioned (i.e.-seasoned) in a plasma, which is comprised of (Cl2-HBr-O2) during a wafer less conditioning step.;

-A polysi layer on the surface of a wafer is then rie etched in a plasma, which is comprised of (Cl2-HBr-O2-He) during a main etching step.;

-The polysi layer on the surface of a wafer is then over etched in a plasma which is comprised of (HBr-He-O2) during an over etching step.; and

-The wafer less cleaning, and the wafer less conditioning steps are then repeated when needed prior to processing additional wafers through the plasma etcher.

This is discussed specifically in columns 3-5; and discussed in general in columns 1-8. This is shown in figures 1-6. Chen et. al. fail, however, to specifically disclose the following aspects of applicant's claimed invention:

-the specific etching/ cleaning/ conditioning process parameters, which are claimed by the applicant

It would have been prima facie obvious to employ any of a variety of different etch processing parameters in the etching/ cleaning/ conditioning processes which are taught above including those which are specifically claimed by the applicant. These are all well known variables in the plasma etching art, which are known to effect both the rate and quality of the plasma etching process. Further, the selection of particular values for these variables would not necessitate any undo experimentation, which would be indicative of a showing of unexpected results.

Alternatively, it would have been obvious to one skilled in the art to employ the specific etch process parameters in the etching/ cleaning/ conditioning processes which are taught above based upon In re Aller as cited below.

"Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F. 2d 454, 105 USPQ 233, 235 (CCPA).

Further, all of the specific process parameters, which are claimed by the applicant, are results effective variables whose values are known to the effect both the rate, and the quality of the plasma etching process.

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

9. Any inquiry concerning this communication should be directed to examiner George A. Goudreau at telephone number (571)-272-1434.

George A. Goudreau
Primary Examiner
Art Unit 1763